

THE *POMADERRIS ORARIA* F. Muell. COMPLEX IN AUSTRALIA.

by

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ABSTRACT

Walsh, N. G. The *Pomaderris oraria* F. Muell. complex in Australia. *Muelleria* 7(2): 267-287 (1990).—The *Pomaderris oraria* complex is defined to include *P. oraria*, *P. paniculosa*, *P. flabellare*, *P. halmaturina* and a new species *P. oblongifolia*. Three new subspecies are described: *P. oraria* subsp. *calcicola* from Victoria, *P. paniculosa* subsp. *paralia* from Western Australia, South Australia, Victoria and Tasmania, and *P. halmaturina* subsp. *continentis* from South Australia and Victoria.

INTRODUCTION

Although some confusion has existed over the application of the name *P. oraria* in the past, most recent authors (e.g. Jessop 1986; Willis 1973; Curtis 1956) have applied the name to a widespread species of southern coasts, and plants of similar appearance from a number of inland, semi-arid sites. Inspection of material labelled *P. oraria* in Australian herbaria has indicated the existence of five distinct taxa. These taxa and other closely related species, comprising a distinctive group within the genus (here referred to as the *P. oraria* complex), are here defined and their distribution and ecology discussed.

DEFINITION OF THE *P. ORARIA* COMPLEX

All taxa within the complex are low to medium shrubs with orbicular to oblong leaves which are invested on the abaxial surface with a dense indumentum of fine stellate hairs, usually overlain with scattered, larger, often rust-coloured stellate hairs. The indumentum of the abaxial surface typically extends around the margin to the adaxial surface, creating a narrow border, a feature which is often used in the field to distinguish members of the *P. oraria* complex from vegetatively similar species such as *P. prunifolia* Cunn. ex Fenzl, *P. betulina* Cunn. and *P. racemosa* Hook. (this feature is however not an infallible guide). The remainder of the adaxial surface varies between taxa from being wholly glabrous to densely hispid with simple or stellate hairs.

The inflorescence is a slender, often interrupted panicle or, by reduction a raceme, containing relatively few, large flowers in comparison to most other members of the genus. The flowers are apetalous, with the outer surface of the sepals and thalamus tube densely covered with a stellate tomentum, and the ovary summit covered by longer stellate hairs. The glabrous inner surface of the sepals is yellow, greenish, sometimes mottled crimson or, occasionally, entirely crimson. The style is divided virtually to the base into three equal, spreading, stigmatic arms.

The most characteristic feature of the group is observed in the development of the ovary after fertilization. In most *Pomaderris* species, the ovary is initially semi-inferior and either remains so or develops upward relative to the rim of the thalamus tube to produce a capsule with at least as much above as below the level of attachment of the (usually deciduous) sepals. In the *P. oraria* complex however, the ovary is initially almost wholly inferior and matures downward relative to the rim of the thalamus tube, and the sepals are persistent.

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TAXONOMY

APPLICATION OF THE NAME *P. RACEMOSA* Hook.

Reisseck (1858) published, in *Linnaea*, several manuscript names of F. Mueller's from specimens collected by or forwarded to Mueller. Of these *P. oraria* and *P. paniculosa* were later united by Bentham (1863) under the earlier name *P. racemosa* Hooker (1834). The type of *P. racemosa* at BM (*Mr Lawrence 143*, Van Dieman's Land, 1831) is a specimen in late bud, vegetatively resembling some taxa within the *P. oraria* complex, but with an indumentum not quite matching, and, on dissection of a bud, showing the ovary raised conically above the rim of the thalamus tube, and the style not deeply trifold, features precluding the specimen from belonging to *P. oraria* or its allies. The form of *P. racemosa* with coarse, rusty stellate vestiture as exemplified by the type occurs in Tasmania and south Gippsland in Victoria. The commoner form of the species in Victoria however has a finer greenish indumentum on the abaxial leaf surface. This latter form corresponds to *P. subrepanda* F. Muell. ex Reisseck (1858) but the two forms are linked by many intermediates, leaving *P. subrepanda* best recognized as a later synonym of *P. racemosa* (as it is regarded in recent texts).

Prior (and in some cases subsequent) to the names *P. oraria* and *P. paniculosa* being published, Mueller labelled many specimens as *P. racemosa* Hook., some of which he or other botanists later amended. Mueller's concept of *P. racemosa* included only those taxa here regarded as part of the *P. oraria* complex and not those represented by the type of *P. racemosa* (i.e. Mueller's *P. subrepanda*).

P. racemosa is typically a slender riparian shrub to c. 7 m high, with ovate or elliptic leaves mostly 1–2 cm long, occasionally obscurely toothed, glabrous above or sprinkled with simple and/or stellate hairs. The flowers are apetalous, produced in slender terminal and/or axillary panicles, have deciduous sepals (c. 1.5 × 1 mm), and the ovary prominently raised and finely stellate-tomentose. The mature capsule is globoid, c. 2.5 mm long and largely superior. The seeds are released through a barely differentiated, membranous operculum which covers virtually the entire inner face of each coccus.

P. racemosa occurs in far south-eastern South Australia, southern Victoria and Tasmania.

KEY TO THE TAXA

1. Leaves fan-shaped (broader than long), crenate or toothed along distal margin, up to 9 mm long (Eyre Penins., S. Aust. only) 3. *P. flabellaris*
1. Leaves orbicular, ovate, lanceolate or oblong, mostly longer than 9 mm 2
2. Leaves toothed or sinuate for the greater part, the longest 30 mm or more; sparsely hispid to subglabrous on adaxial surface (Kangaroo Is. and south east S. Aust., and Lower Glenelg region, Vic., only) 3
2. Leaves entire (rarely irregularly crenate) and mostly less than 30 mm long, or if with a few shallow subapical teeth and/or longer than 30 mm then densely hispid on adaxial surface 4
3. Sepals 2–2.5 mm long, c. 1.5 mm wide at base; leaf margins mostly serrate; mainly Kangaroo Is. (three collections from far south-east S. Aust) 4. *P. halmaturina* subsp. *halmaturina*
3. Sepals 1.5–2 mm long, c. 1 mm wide at base; leaf margins mostly sinuate (Extreme south east S. Aust. and the Lower Glenelg R. region of Vic.) 4. *P. halmaturina* subsp. *continentis*
4. Leaves ± oblong (length:width > c. 3:1), mostly about 3 × 1 cm (endemic in gorge tract of Snowy R. near Gelantipy, Vic.) 5. *P. oblongifolia*
4. Leaves orbicular to ovate (length:width mostly < 3:1, if ever > 3:1 then leaves much larger than 3 × 1 cm) 5
5. Largest leaves mostly < 15 mm; flowers mostly in small axillary clusters (from Ravensthorpe area, W. Aust. to central Vic., ? south-west N.S.W., but not Tas.) 2. *P. paniculosa* subsp. *paniculosa*

5. Largest leaves 15 mm long or more; flowers in narrow, interrupted panicles which are usually both axillary and terminal 6
6. Leaves glabrous on adaxial surface (coastal, from near Esperance, W. Aust., to Gippsland, Vic. and Tas.) 2. *P. paniculosa* subsp. *paralia*
6. Leaves hispid or velutinous on adaxial surface 7
7. Leaves broad elliptic (length:width < 3:2), often emarginate and with a few subapical teeth; adaxial surface sparsely to moderately densely coarsely hispid; coastal in south-eastern Vic. and north-eastern Tas. 1. *P. oraria* subsp. *oraria*
7. Leaves ovate to narrowly elliptic (length:width mostly > 3:2), rounded or subacute at apex; adaxial surface densely hispid to almost velutinous; limestone areas of eastern Vic 1. *P. oraria* subsp. *calcicola*

1. **Pomaderris oraria** F. Muell. ex Reisseck, *Linnaea* 29:268 (1858). LECTOTYPE (here chosen): Tasmania, *s.dat.*, Stuart (MEL 55377).

Shrub to c. 2 m high. *Stipules* subulate, c. 2 mm long, densely stellate tomentose, caducous. *Leaves* alternate, narrowly to broadly elliptic, hispid to subvelutinous above, densely white stellate-tomentose below with larger rusty hairs above the midrib and lateral nerves. *Inflorescence* of axillary and terminal panicles, usually consisting of several, more or less globular clusters of flowers, occasionally reduced to a single cluster, each panicle usually about as long as the subtending leaf. *Flowers* shortly pedicellate, densely stellate tomentose on outer surface; thalamus tube conical; sepals broadly acute; stamens about as long as sepals; style 1–1.5 mm long, deeply trifid; ovary summit densely covered with long stellate hairs. *Capsule* c. 3 mm long; cocci broadly ovate, 2–2.5 mm long, dorsally rounded, the membranous operculum occupying the greater part of the inner face. *Seed* flattened-ellipsoid, 1.5–2 mm long, slightly ridged along the ventral line, pale brown with a small white aril at base.

Pomaderris oraria subsp. *oraria* W. M. Curtis, *Stud. Fl. Tasm.* 1:112 (1956) *pro parte*; J. H. Willis, *Handb. Pl. Vic.* 2:366 (1973) *pro parte*; L. Costermans, *Native Trees and Shrubs SE Aust.* (form a) *pro parte* 216 (1981); *non* Jessop in J. P. Jessop & H. R. Toelken (eds), *Fl. S. Australia* 2:812 (1986).

P. racemosa auctt. *non* Hook. (1834); Benth., *Fl. Austral.* 1:421, 422 (1863) (form a only); Rodway, *Tasm. Fl.* 26 (1903) *pro parte*; Ewart, *Fl. Victoria*, 748 (1931).

Compact, much-branched shrub to c. 1 m high. *Leaves* often emarginate and shallowly toothed toward the apex, mostly 1–3 × 0.8–2.3 cm, hispid above with simple or stellate hairs, the nerves deeply impressed. *Flowers* with thalamus tube c. 1.5 mm long; sepals 1.5–2.2 × 1–1.3 mm. (Fig. 1)

REPRESENTATIVE SPECIMENS (Total examined 11):

Victoria—Wilsons Promontory, Darby River, at start of track to Tongue Point, 38° 59'S, 146° 16'E, 2.xi.1980, *M. G. Corrick* 7074 (MEL); Reeves Beach, near western limit of 90-mile Beach, 38° 37'S, 146° 55'E, 14.vi.1986, *N. G. Walsh* 1600 (CANB, HO, MEL).

Tasmania—NE, (Badger Head), ix.1972, *M. Cameron* (HO); Big Peppermint Hill, East Coast, 42° 01'S, 148° 53'E, 15.vii.1980, *A. Moscal* 383 (HO).

DISTRIBUTION AND CONSERVATION STATUS (Fig. 9):

The subspecies is known with certainty only from coastal sites in northern Tasmania (near Badger Head) and south-eastern Victoria on Wilsons Promontory and the western end of the 90-mile Beach. A sterile Tasmanian specimen from Big Peppermint Hill is tentatively referred to this subspecies but the coarsely toothed leaves and tall-forest habitat are atypical.

The subspecies is regarded as rare, with Risk Code 3RCat (Briggs & Leigh, 1989).



Fig. 1. *Pomaderris oraria* subsp. *oraria*. a—flowering twig, $\times 1$. b—flower, $\times 8$. c—upper surface of leaf, $\times 4$. d—lower surface of leaf, $\times 4$. Drawn from *Corrick 7074* (MEL 596732).

HABITAT:

In Victoria, the plants occur on pure siliceous sands on secondary dunes 100–500 m from the coast and on shallow sand over granite a few metres above the high water mark. In Tasmania at Badger Head, the population occurs on skeletal soils developed over fine siltstone on clifftops and foredune slopes within c. 100 m of the shore.

The subspecies occurs in coastal scrub vegetation both in Tasmania and on the mainland with associated species including *Banksia integrifolia*, *B. marginata*, *Acacia sophorae*, *Correa alba* and a distinctive coastal form of *Pomaderris apetala*. At Wilsons Promontory, *P. oraria* subsp. *oraria* grows closely with the more widespread coastal *Pomaderris*, *P. paniculosa* subsp. *paralia* (described below), but no intermediates have been observed.

Pomaderris oraria* subsp. *callicola N. G. Walsh *subsp. nov.*

P. oraria *auctt. non* F. Muell. *ex* Reisseck (1858); J. H. Willis, *Handb. Pl. Vic.* 2:366 (1973) *pro parte*; L. Costermans, *Native Trees and Shrubs SE Aust.* (form b) 216 (1981).

a subspecie typica foliis longioribusque integris et floribus majoribus et habitatione ab ora differt.

TYPUS: Victoria, Gippsland Lakes, Toorloo Arm (Stony Ck crossing of the Princes Highway), 37° 48'15"S, 148° 02'45"E, 14.i.1987, *D. E. Albrecht 3039*. (HOLOTYPUS: MEL 689186; ISOTYPUS: CBG).

Distinguished from the typical subspecies in the longer (to 7 cm), relatively narrower leaves (length-breadth ratio mostly exceeding 3:2), with entire margins and obtuse (very rarely emarginate) apices, in the generally larger flowers (thalamus tube c. 2 mm long, sepals 2–2.5 × 1.2–1.5 mm) and in the non-coastal habitat. In addition the shrubs tend to be taller, to c. 2 m high and more diffuse, the panicles longer (usually exceeding the subtending leaves), with rather remote clusters of flowers, and the indumentum on the upper leaf surface very densely hispid to subvelutinous. (Fig. 2)

REPRESENTATIVE SPECIMENS (Total examined 32):

Victoria—Marble Gully outside Bindi Station, 25.xi.1970, *K. C. Rogers* (MEL); Cliffs along Buchan River at Buchan, 15.i.1948, *J. H. Willis* (MEL); Murrindal, 19.x.1947, *N. A. Wakefield 2083* (MEL); c. 2 miles NNE of Swan Reach on Bruthen Rd 27.iii.1971, *A. C. Beauglehole 37682* (MEL, NSW); Stokes Cliffs, northern side of Mitchell R., near Bairnsdale, 29.viii.1925, *T. S. Hart* (MEL); Scriveners Rd, 200 m east of Mississippi Ck, 4 km NW of Lakes Entrance, 37° 50'20"S, 147° 57'00"E, 26.viii.1978, *P. K. Gullan 386 & N. G. Walsh* (MEL).

DISTRIBUTION AND CONSERVATION STATUS (Fig. 9):

P. oraria subsp. *callicola* is apparently confined to eastern Victoria and occurs sporadically in a rough rectangle between Bairnsdale, Orbost, Wulgulmerang and Omeo.

The subspecies is rare with Risk Code 2RCi (Briggs & Leigh, 1989). The population from which the type collection was made has been largely and possibly entirely destroyed through road realignment and bridge building works on the Princes Highway between Lakes Entrance and Nowa Nowa. Elsewhere within the subspecies' range, populations have been lost or severely reduced through clearing for agriculture of favoured limestone country. Populations are contained within the Murrindal Natural Features Zone and the Lakes Entrance-Lake Tyers Coastal Reserve, but only the former is managed as a biological reserve.

HABITAT:

The subspecies is apparently confined to reddish loams and skeletal soils derived from Devonian and Tertiary limestones at sites where the parent material is exposed. On drier sites (e.g. at Buchan, and Marble Creek near Bindi), it is dominant within a characteristic closed shrubland where associated with, e.g. *Bursaria lasiophylla* and *Allocasuarina verticillata*.

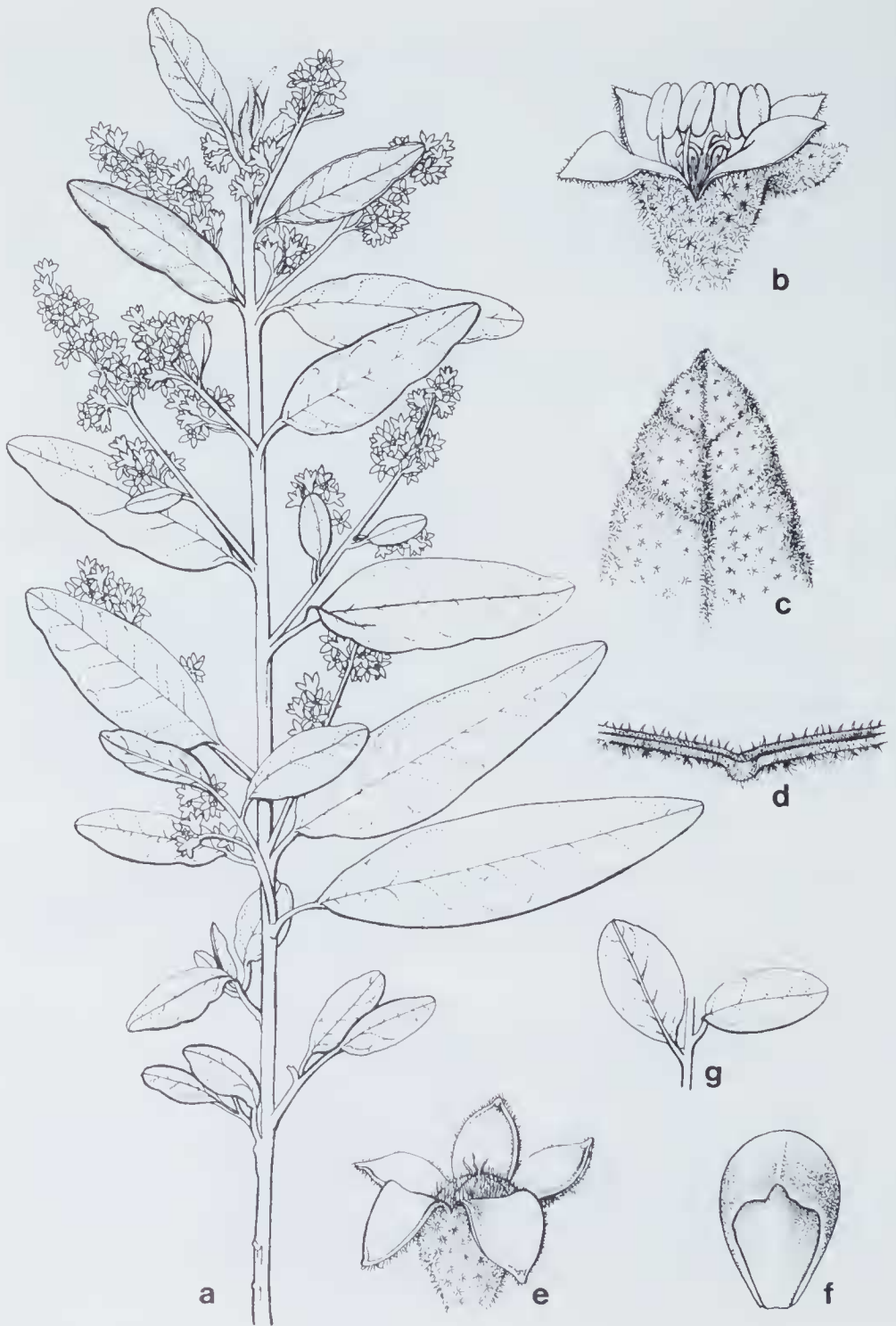


Fig. 2. *Pomaderris oraria* subsp. *calcicola*. a—flowering twig, $\times 1$. b—flower, $\times 8$. c—lower surface of leaf, $\times 4$. d—t.s. through leaf, $\times 10$. e—near mature capsule, $\times 6$. f—coccos, ventral face, $\times 12$. g—portion of small-leaved form, $\times 1$. a-d from the holotype; e, f from Hart s.n. (MEL 55459); g from Willis s.n. (MEL 1564143).

NOTES:

Two recently described species [see *Muelleria* 7(1) 1989] of restricted occurrence occur with the *Pomaderris*, viz. *Acacia caerulescens* Maslin & Court at Buchan and Toorloo Arm (type locality of *P. oraria* subsp. *callicola*), and *Olearia astroloba* Lander & Walsh at Marble Gully near Omeo.

Although in description, the differences between the two subspecies of *P. oraria* may seem trivial, the different appearance of each in the field and their individualistic habitat preferences justifies their separation at least at a subspecific level.

The epithet *callicola* (= inhabiting limestone or marble) is derived from the subspecies' habitat preference.

2. ***Pomaderris paniculosa*** F. Muell. ex Reisseck, *Linnaea* 29:269 (1858). LECTOTYPE (here chosen): Nov. Holland. meridional., *F. Mueller s.dat.* (W), in part, see notes below.

Shrub to 2.5 (but mostly to c. 1) m high. *Stipules* subulate, c. 2 mm long, densely stellate tomentose, early caducous and often apparently lacking. *Leaves* alternate, rotund, broadly elliptic, ovate or obovate, sometimes shallowly emarginate, rarely obscurely toothed, glabrous or very shortly hispid above with simple or stellate hairs, densely stellate-tomentose below, wholly pale or with larger rusty hairs scattered or above the nerves. Inflorescence of axillary and/or terminal panicles or racemes. *Flowers* shortly pedicellate, densely stellate-tomentose on outer surface; thalamus tube conical; sepals acute; stamens about as long as sepals; anthers elliptic, 0.5–1 mm long; style 0.5–1 mm long, deeply trifid; ovary summit densely covered with long stellate hairs. *Capsule* c. 3 mm long; cocci broadly ovate, 2–2.5 mm long, dorsally rounded, the membranous operculum occupying the greater part of the inner face. *Seed* as for *P. oraria*.

Pomaderris paniculosa* subsp. *paniculosa

Pomaderris oraria auctt. non F. Muell. ex Reisseck (1858): J. H. Willis, *Handb. Pl. Vic.* 2:366 (1973) *pro parte*; Jessop in J. P. Jessop & H. R. Toelken (eds), *Fl. S. Australia* 2:812 (1986) *pro parte*; W. E. Blackall & B. J. Grieve, *How to Know W. Australian Wildflowers* 1&2:331 (1981); S. W. L. Jacobs & J. Pickard, *Pl. New South Wales* (1981).

Pomaderris racemosa auctt. non Hook. (1834): J. M. Black, *Fl. S. Australia* 546 (1952) *pro parte*; Benth., *Fl. Austral.* 1:421,422 (1863) (form c only); Ewart, *Fl. Victoria*, 748 (1931) *pro parte*.

Leaves generally obovate or elliptic, mostly 8–15 × 6–12 mm, sometimes slightly folded about the midrib, glabrous or very shortly hispid above with simple or stellate hairs, lateral nerves not strongly impressed; Inflorescence of axillary panicles, or more commonly, racemes, about as long as the subtending leaf, often reduced to a single umbellate cluster (new growth occurs mostly terminally on flowering branches). *Flowers* with thalamus tube 1–1.5 mm long; sepals 1.5–2 × 1–1.3 mm. (Fig. 3)

REPRESENTATIVE SPECIMENS (Total examined 268):

Western Australia—Gales Brook, 1863, *Maxwell* (MEL, PERTH); 30 km SE of Ongerup, 23.x.1975, *K. Newbey* 4866 (MEL, PERTH); Ravensthorpe Range, 22.ix.1926, *C. A. Gardner Herb.* 1849, (PERTH); South of Roes Rock, Fitzgerald River Natl Park, 34° 00'S, 119° 25'E, 17.vii.1970, *A. S. George s.n.* (PERTH).

South Australia—Gawler town, xi.1848, *F. Mueller* (MEL); Guichen Bay, ix. 1850, *F. Mueller* (MEL); Cape Donnington, Port Lincoln, *s. dat.*, *Wilhelmi* (MEL); Yorke Peninsula, 1879, *Tepper* 554 (MEL); Northern Yorke Peninsula, Mona Railway Yard c. 5 km W of Bute, 12.x.1966, *B. Copley* 723 (AD, MEL); Kangaroo Is., Kelly Hill Conservation Reserve, 12 km ENE Cape du Couedic, 4.xi.1958, *P. G. Wilson* 712 (AD); Barratts Scrub, 37° 02'S, 140° 16'E, 15.xi.1981, *P. Gibbons* 39 (AD, MEL).

Victoria—Bendigo district, Whipstick, in Mystery Paddock, 11.x.1961, *W. Pery s.n.* (MEL); NW of Lake Albacutya, ix.1887, *C. French* (MEL); Hawkesdale, x.1900, *H. B. Williamson s.n.* (MEL); The Range Flora Reserve, 18 km ENE of Donald, 24.x.1979, *A. C. Beauglehole* 65387 (MEL); Limestone rises, Jeparit, 12.xi.1899, *D'Alton* (MEL); Dimboola, 13.ix.1899, *D'Alton* (MEL); c. 5 miles NNW of Wedderburn, 31.x.1961, *J. H. Willis s.n.*, (MEL).

DISTRIBUTION AND CONSERVATION STATUS (Fig. 9):

In Western Australia, scattered from the Ravensthorpe-Ongerup district eastward to near Esperance, apparently absent from there to about Ceduna in South Australia, thence from the eastern part of the Great Australian Bight near to the coast eastward and inland across to the Victorian Wimmera (where now probably extinct) through to the Bendigo area. Bentham gives 'desert of the Darling and Murray, F. Mueller' but I have not seen this specimen or any others from New South Wales. A specimen in NSW from the Bourke district, collected in 1912 formerly regarded as *P. oraria* (e.g. Cunningham *et al.*, 1982, Jacobs & Pickard, 1981), belongs to a species of *Keraudrenia*, probably *K. integrifolia*. *P. paniculosa* subsp. *paniculosa* is not regarded as being rare or vulnerable in Australia, but has been substantially depleted through much of its range in Victoria.

HABITAT:

Occurs principally in semi-arid areas (annual rainfall c. 500 mm or less), on soils derived from marine sediments (limestone, sandstone) or aeolian sand. The most commonly associated vegetation type is mallee scrub or woodland. Ecological information from labels is scanty but *Eucalyptus viridus*, *E. microcarpa*, and *E. leucoxylon* are given as associated species in Victoria, *E. porosa*, *E. gracilis*, *E. socialis*, *E. cladocalyx* and *E. leucoxylon* in South Australia and *E. eremophila* in Western Australia.

NOTES:

The type sheet at W consists of four small twigs, all of which conform to the typical form of *P. paniculosa* as defined herein. The twig mounted to the left of the sheet (the largest) has numerous flowers and leaves with a fine stellate indumentum on the adaxial surface. The twig to its right has few flowers and leaves with simple hairs adaxially. The two twigs mounted on the right of the sheet are sterile and have leaves which are glabrous adaxially. These four pieces may have been provided by Mueller to represent the range of variation of leaf indumentum states within the species, but as the sheet clearly comprises more than one collection, the larger, flowering specimen on the left of the sheet is here chosen as the lectotype.

The presence or nature of the indumentum on the upper surfaces of the leaves, although generally a useful and often critical feature in distinguishing taxa in Pomaderris, in this subspecies does not appear to correlate with any other discontinuous characters. Forms with either glabrous or hispid leaf upper-surfaces occur together. A sheet at MEL (55467) from near Bendigo, Vic., consists of three flowering twigs, two with entirely glabrous and one with distinctly hispid leaf upper-surfaces with the comment 'all specimens from same shrub'. This seems unlikely, but given the frequent sympatry of both forms, no formal recognition is here bestowed upon them.

Specimens from Western Australia are uniform in having a dense stellate indumentum on the upper leaf-surfaces. Most, but not all, eastern populations are either glabrous or hispid with simple bristles.

In a few coastal sites in South Australia (e.g. near Kingston in the south-east and shores of Spencers Gulf) where mallee scrubs occur along the coast, this and the following subspecies are apparently sympatric or nearly so. A few specimens appear intermediate between the two (due at least in part to the poor quality of those collections), but the great majority can be unambiguously placed.

Pomaderris paniculosa subsp. **paralia** N. G. Walsh *subsp. nov.*

P. oraria *auctt. non* F. Muell. *ex* Reisseck (1858): W. M. Curtis, *Stud. Fl. Tasm.* 1:112 (1956) *pro parte*; J. H. Willis, *Handb. Pl. Vic.* 2:366 (1973) *pro parte*; L. Costermans, *Shrubs and Trees SE Aust.* (form a) 216 (1981) *pro parte*; Jessop in J. P. Jessop & H. R. Toelken (eds), *Fl. S. Australia* 2:812 (1986) *pro parte*.

Pomaderris racemosa *sensu* J. M. Black, *Fl. S. Australia* 546 (1926) *pro parte*; *sensu* Benth., *Fl. Austral.* 1:421,422 (1863) (as form b); *sensu* Ewart, *Fl. Vic.*, 748 (1931) *pro parte, non* Hook.

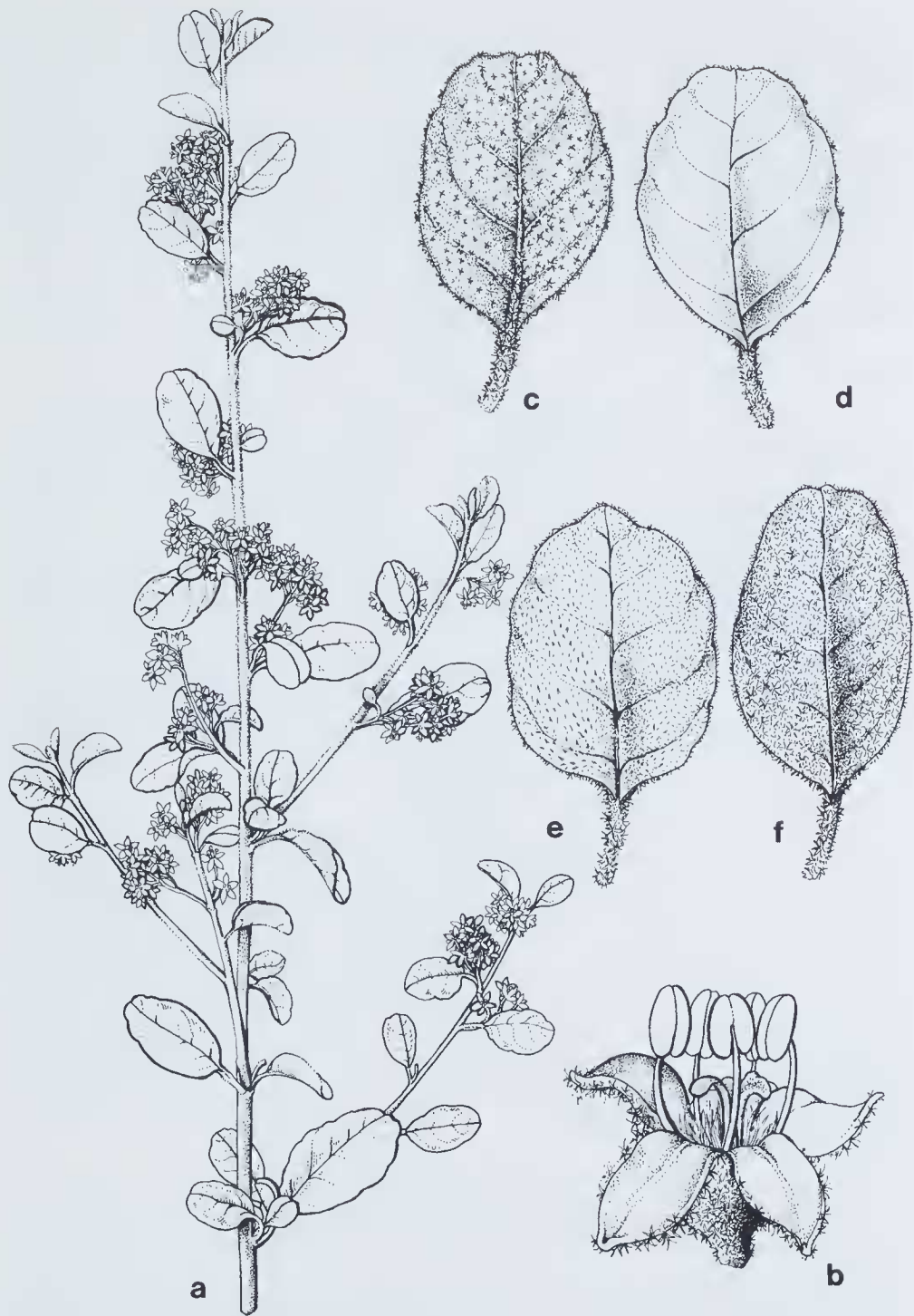


Fig. 3. *Pomaderris paniculosa* subsp. *paniculosa*. a—flowering twig, $\times 1$. b—flower, $\times 10$. c—lower surface of leaf, $\times 4$. d—f leaf from above, $\times 4$; d—glabrous form; e—simple-hispid form; f—stellate-pubescent form. a-d from Perry s.n. (MEL 530738); e from Newbey 4866 (MEL 91863).

a subspecies typica foliis majoribus, ovatis vel ellipticis, pagina supra semper glabro, et paniculis ambabus terminalis et axillaribus, et habitatione ad oram differt.

HOLOTYPE: Victoria, Torquay, ca. 25 km S of Geelong; 23.x.1943, *J. H. Willis s.n.* (MEL 91852).

Differs from the typical subspecies in its generally larger, ovate to elliptic leaves (mostly 15–50 × 10–25 mm) which are consistently glabrous (and shining *in vivo*) on the upper surface, and the inflorescence which generally comprises both axillary and terminal panicles, most of which are longer than the subtending leaves, (new growth is therefore initiated usually below the flowering part of the branches), and in its more strictly coastal habitat.

In addition, the leaves are thicker and firmer than those of *P. paniculosa* subsp. *paniculosa* and the flowers are generally larger (with sepals to 2.5 × 1.5 mm), but this latter character is variable. (Fig. 4)

REPRESENTATIVE SPECIMENS (Total examined 135):

Western Australia—Middle Island, Recherche Archipelago, 25.xi.1950, *J. H. Willis s.n.* (MEL).

South Australia—Yorke Peninsula, Innes National Park, Cape Spencer, 35° 18'S, 136° 53'E, 7.xii.1982, *E. M. Canning 5524 & S. Corbett* (CBG, MEL); Memory Cove, v.1802, *R. Brown s.n.* (MEL, part); Yorke Peninsula, 1880, *Tepper 583* (MEL); Kangaroo Island, 30.vii.1950, *A. Cribb & L. Newton* (MEL); Region 13, south-eastern, 38° 00'S, 140° 57'E, *J. Z. Weber 7788* (AD, MEL); Near Rivoli Bay, x.1848, *F. Mueller* (MEL); Coffin Bay National Park, 34° 43'S, 135° 30'E, 11.xi.1979, *P. C. Heyligers 79095* (AD, CANB).

Victoria—The Lakes National Park, 7 km NE of Golden Beach, 20.xii.1978, *A. C. Beauglehole 62915* (MEL); Australia Felix, *s. dat.*, *F. Mueller* (MEL); Scenic Rd, S of Portland, 38° 21'S, 141° 36'E, *C. & D. Woolcock 1136* (MEL). Cape Schanck Coastal Park, 1.8 km N from Cape Schanck, 9.viii.1981, *N. G. Walsh 587* (MEL). Port Campbell National Park, c. 2.5 km NW from Pt Ronald, 29.v.1984, *N. G. Walsh 1246* (MEL); Wilsons Promontory, Darby River at start of track to Tongue Point, 38° 59'S, 146° 16'E, 2.xi.1980, *M. G. Corrick 7073* (MEL).

Tasmania—Erith Is, Kents Group, 8.xii.1972, *J. S. Whinray 186* (MEL); East Sister Is, Furneaux Group, 30.ix.1972, *J. S. Whinray 269* (MEL); Cape Portland, 1884, *Miss Baudinet* (HO, MEL); Swan Is, -iii.1885, *Judge Dobson* (HO, MEL); Cape Wickham, Kings Is, 1886, *Judge Dobson* (MEL); Port Davies, Flinders Is., 40° 00'S, 147° 52'E, *W. M. Curtis s.n.* (HO); Croppies Point, north of Waterhouse, 40° 51'S, 147° 37'E, 30.vi.1986, *R. J. Peacock s.n.* (MEL).

DISTRIBUTION AND CONSERVATION STATUS (Fig. 9):

P. paniculosa subsp. *paralia* occurs in Western Australia where it is known from a single collection from limestone sea-cliffs of Middle Island in the Recherche Archipelago. The specimen has smaller leaves than typical, but is rather fragmentary. Further material from this area is required to confirm the status of the subspecies in W.A. In South Australia it occurs along the coast from the eastern part of the Great Australian Bight to the Victorian border, and from there along much of the Victorian coast to as far east as the central part of the 90-Mile Beach. In Tasmania it is distributed across the north coast and through the islands of Bass Strait. A specimen purportedly from near Robertson in the northern Mt Lofty Range, S. Aust. (*Amtsberg s.n.*, AD 97244147) appears to be this subspecies, but its occurrence at a locality so far inland is unlikely, suggesting the specimen may be incorrectly labelled. The subspecies is not regarded as rare or threatened.

HABITAT:

Occurs on coastal dunes, cliffs of limestone, sandstone and granite along marine and estuarine shores, occasionally extending inland up to c. 500 m, rarely to c. 10 km as in the Murray Bridge and Mt Gambier (SE South Australia) areas where occurring on old dunes.

Usually included in coastal scrub vegetation with other shrubs e.g. *Leptospermum laevigatum*, *Melaleuca lanceolata*, *Correa alba*, *Kunzea ambigua*, *Lasiopetalum baueri* or in adjacent woodlands dominated by e.g. *Eucalyptus baxteri*.

NOTES:

This is the commonest coastal taxon of the *P. oraria* complex and (probably as a consequence) is the taxon which has been hitherto regarded as 'typical' *P.*



Fig. 4 *Pomaderris paniculosa* subsp. *paralia*. a—flowering twig, $\times 1$. b—flower, $\times 7$. c—mature capsule, $\times 10$. d—lower surface of leaf, $\times 4$. a, b from the holotype; c, d from *Beaglehole* 63525 (MEL 92885).

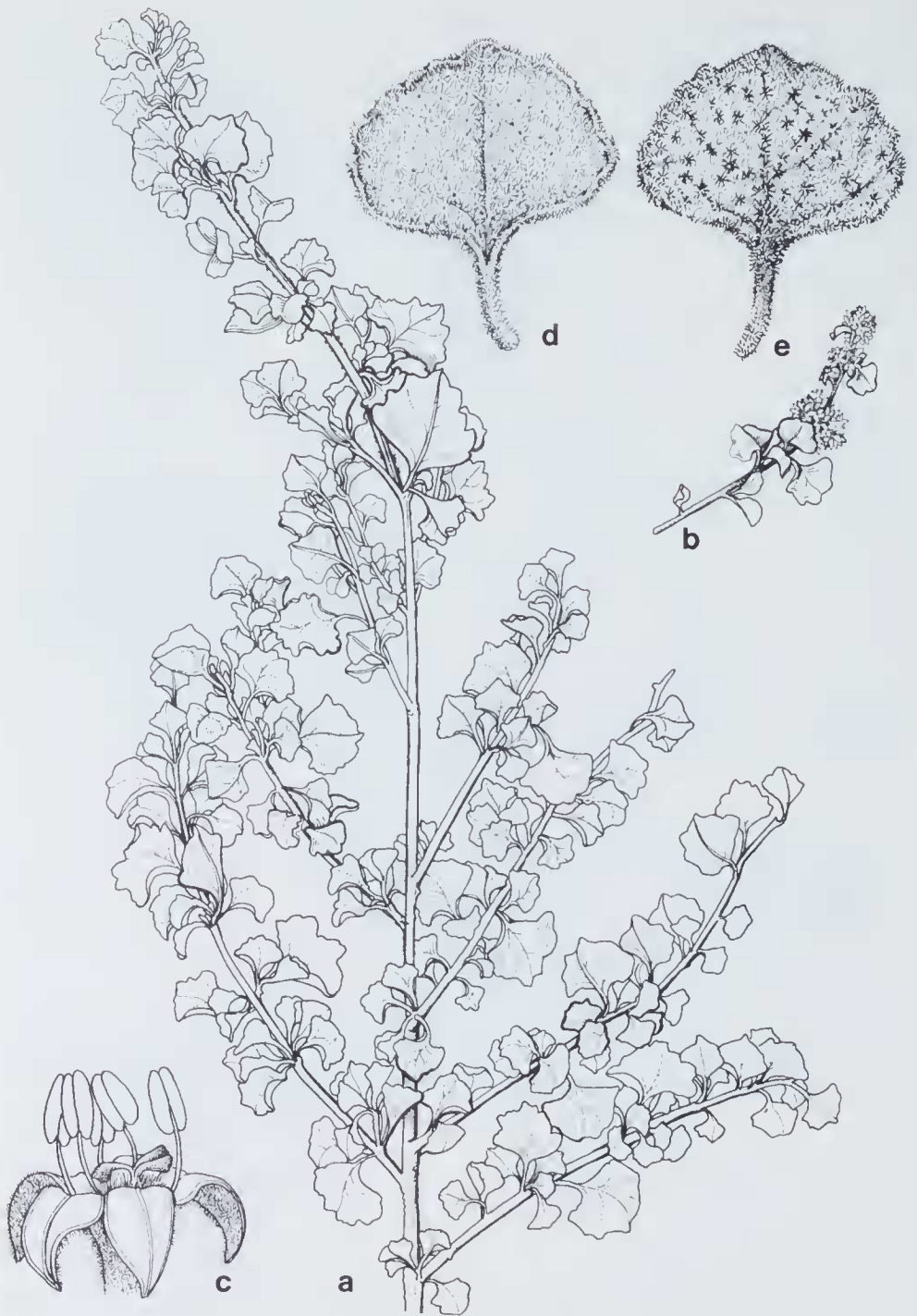


Fig. 5. *Pomaderris flabellaris*. a—Leafy branchlet, $\times 1$. b—flowering twig, $\times 1$. c—flower, $\times 1$. d—upper surface of leaf, $\times 5$. e—lower surface of leaf, $\times 5$. a, d, e from *Filson 1585* (MEL 1011313); b, c from *Brown s.n.* (MEL 55399).

oraria by most botanists and naturalists. It is readily distinguished from *P. oraria sens. strict.* by the glabrous (rather than hispid) leaf upper-surface, and the entire, rarely irregularly crenate or emarginate leaves with less deeply impressed midrib and lateral veins. At Wilsons Promontory both taxa occur together with no apparent intergradation.

At their extremes, the two subspecies of *P. paniculosa* appear to be sufficiently distinct to be regarded as separate species, but the differences become less sharp where the two taxa occur in near proximity in a few areas in S.A. where mallee scrubs occur immediately inland of primary dune vegetation.

Recently *P. paniculosa* subsp. *paralia* has been used in coastal areas as a hardy species for amenity and revegetation planting.

The epithet is derived from Greek, meaning 'by the shore' and is, appropriately, equivalent to the Latin 'oraria'.

3. ***Pomaderris flabellaris*** (F. Muell. ex Reisseck) J. Black, Fl. S. Australia 366 (1926); Jessop in J. P. Jessop & H. R. Toelken (eds), Fl. S. Australia 2:811 (1986).

Trymalium flabellare F. Muell. ex Reisseck, Linnaea 29:281 (1858). LECTOTYPE (here chosen): Boston Point, F. Mueller (MEL 55208). LECTOPARATYPE: Scrub near Meadow Ck, i.1855, *Wilhelmi* (MEL 55205).

A shrub to c. 1 m high. *Stipules* subulate, c. 1.5 mm long, stellate tomentose, early caducous. *Leaves* alternate, flabellate or elliptic, wider than long, the distal margin usually crenate or toothed, flat to almost conduplicate, 4–9 × 5–14 mm, densely covered on both surfaces with stellate hairs (or very rarely glabrous above), with some larger, rusty hairs above the veins on the lower surface; venation indistinct above, apparent beneath. *Inflorescence* of short axillary and terminal racemes or slender, few flowered panicles to 2 cm long; *Flowers* shortly pedicellate, densely stellate-tomentose on outer surface; thalamus tube conical, 1–1.5 mm long; sepals acute, 2–2.5 × 1–1.5 mm; stamens subequal to sepals; anthers elliptic, c. 1 mm long; style c. 1 mm long, deeply trifid; ovary summit densely covered with long stellate hairs, slightly raised. *Fruits* not known. (Fig. 5)

REPRESENTATIVE SPECIMENS (Total examined 38):

South Australia—Boston Point, Spencers Gulf, s. dat., *Wilhelmi* (MEL); Port Lincoln, 1875, *J. H. Brown s.n.*, (MEL); Port Lincoln, 7.ii.1960, *R. Filson 1585* (MEL); Eyre Peninsula, 2 miles east of Wanilla, xi.1955, *D. J. Smith 221* (MEL); Tod River—Wanilla area, 4.ix.1969, *K. B. Warnes 108* (AD); Hundred of Koppio, north end, 18.ix.1964, *C. R. Alcock C42* (AD).

DISTRIBUTION AND CONSERVATION STATUS (Fig. 9):

P. flabellaris is known only from the Eyre Peninsula, South Australia, particularly in the southern part about Port Lincoln. It is not regarded as rare or threatened by Briggs and Leigh (1988).

HABITAT:

Occurs on shallow soils derived from granite, laterite and quartzite, and is also recorded from sand dunes. Information accompanying specimens is scanty but one collection gives *Eucalyptus cladocalyx* as dominant in the associated vegetation.

NOTES:

In the protologue of *Trymalium flabellare*, Reisseck cites two collections, Boston Point, F. Mueller and Meaton Ck, *Wilhelmi*. Of the former, there are two sheets at MEL (both ex Sonder Herb.), both with small sterile twigs and a few fragments in envelopes. The larger specimen of these (with two leafy twigs) has been chosen as the lectotype and the smaller (MEL 55206) an isolectotype. The label, written in Mueller's hand, has: '*Pomaderris (Trymalium) rotundifolia* F. Muell.' (presumably an earlier manuscript name) and below, an addition by Sonder: '*Trymalium flabellare* F. Muell.'

There is also at MEL a Wilhelmi collection labelled: 'Scrub near Meadow Ck, Jan 1855 (MEL 55205). This is almost certainly the 'Meaton Ck' specimen referred to by Reisseck (there appears to be no Meaton Ck in S. Aust.) and is here treated as a lectoparatype.

Black retained the specific epithet *flabellare* when transferring the species from *Trymalium* to *Pomaderris*, but H. J. Eichler (1965) corrected this to *flabellaris*. Of the 38 specimens examined, none were fruiting or had clearly developing ovules. Pollen examined from two specimens in early flower and stained in Alexander's Solution (Alexander, 1969) showed high apparent viability (c. 80–90%). Field studies are required to confirm that *P. flabellaris* is in fact a good breeding species and not an occasional (? female-) sterile hybrid perhaps between *P. paniculosa* and *P. obcordata*, some specimens of which have leaves approaching *P. flabellaris* in shape and indumentum.

4. ***Pomaderris halmaturina*** J. Black, Trans. R. Soc. S. Australia 49:273 (1925). LECTOTYPE (here chosen): South Australia, Kangaroo Island, Cygnet River, 27.01.1883, Tate, s.n. (AD 97016246 p.p.); ISOLECTOTYPES: AD (97932315 p.p., 07018154 p.p.).

Erect to spreading shrub. Stipules subulate, to c. 7 mm long, densely stellate tomentose, caducous. *Leaves* alternate, narrow elliptic to ovate, margins toothed for the greater part or sinuate, rarely almost entire, 2.5–5.5 × 1.2–2.5 cm, glabrous or sparsely hispid with simple or stellate hairs above, densely stellate tomentose below with larger, rusty hairs above the veins; venation distinct on both surfaces, impressed above. *Inflorescence* of rather sparse axillary and terminal panicles or racemes about as long as the subtending leaf. *Flowers* pedicellate, densely stellate-tomentose on outer surface; thalamus tube conical; sepals acute; stamens slightly shorter than sepals; anthers elliptic, c. 0.5 mm long; style c. 0.5 mm long, deeply trifid; ovary summit covered with stellate hairs. *Capsule* c. 3 mm long; cocci slightly shorter than capsule, the membranous operculum occupying almost all of the inner face. *Seed* as for *P. oraria*.

Pomaderris halmaturina* subsp. *halmaturina

J. Black, Fl. S. Australia 3:366 (1926); Jessop in J. P. Jessop & H. R. Toelken (eds), Fl. S. Australia 2:812 (1986).

Shrub to c. 3 m high. *Leaves* with dentate to biserrate margins, rarely almost entire. *Flowers* with thalamus tube c. 2 mm long; sepals 2–2.5 × c. 1.5 mm. (Fig. 6)

REPRESENTATIVE SPECIMENS (Total examined 36):

South Australia—Kangaroo Island; SE end of island, rich limestone soil, 25.vi.1884, *Tepper 1310* (MEL); Near the small Fr. Water Lagoon of the Three Well (= Cygnet) River, s.dat., *Waterhouse* (MEL); Chapman River, 35° 48'S, 138° 07'E, 11.x.1976, *Spooner 4837* (AD); Hog Bay, 3rd Ck from west of bay, 36° 44'S, 137° 56'E, 29.xi.1983, *R. Davies 474* (AD). Willsons R., Dudley Peninsula, walking track to Mount Flat, 3.11.1984, *G. Jackson 1681* (AD); Rocky R., c. 20 km SSE from Cape Borda, 24.xi.1945, *J. B. Cleland s.n.* (AD). South-east: Toward Carpenter Rocks, c. 16 km from Glencoe Rd crossing, 37° 58'S, 140° 28'E, 3.xi.1981, *N. N. Donner 8508* (AD).

DISTRIBUTION AND CONSERVATION STATUS (Fig. 9):

Almost entirely confined to Kangaroo Island, South Australia and there largely restricted to near-coastal sites on the southern part of the island. Three collections (*Alcock 185*, *Donner 8508*, *Spooner 5486*, all AD) from near Kingston and the Carpenter Rocks area near Mount Gambier in the far south-east, are referable to the typical subspecies and are the only known mainland occurrences.

The subspecies is regarded as endangered (risk code 2E) by Briggs and Leigh (1989).



Fig. 6. *Pomaderris halmaturina* subsp. *halmaturina*. a—flowering twig, $\times 1$. b—flower, $\times 8$. Drawn from Jackson 1718 (MEL 1564144).

HABITAT:

Apparently confined to limestone country, often occurring in scrubby riparian or estuarine vegetation. Commonly associated species were generally not indicated on labels but those listed include *Eucalyptus diversifolia*, *Acacia* and *Leptospermum* (species unknown). The habitat of the mainland populations was not recorded on labels, but *Spooner 5486* notes 'dominant at higher elevations'.

NOTES:

In the protologue, Black cites two syntype collections, viz. Hog Bay and Cygnet River. Three sheets at AD exist with type material; one (AD 97016246) with twigs from both localities has been mounted without indication to the provenance of each but, by reference to the collection dates on the two original labels, it is reasonable to assume that the fruiting twig (collected in January 1883) is the Cygnet River collection and the flowering twig (collected November 1883) is the Hog Bay specimen; another (AD 07018154), is a mixture of fragments of both type collections found in N. A. Wakefield's herbarium (at MEL) and subsequently returned to AD; and the last (AD 97932315), a mixed collection from Cygnet River, of *P. halmaturina* and *P. paniculosa* subsp. *paniculosa* (the latter clearly does not fall within Black's circumscription of *P. halmaturina* and therefore does not comprise syntype material). The specimen mounted on the left side of AD 97016246 is here chosen as the lectotype. Material of *P. halmaturina* from Cygnet River on sheets AD 07018154 and AD 9793215 thus become isolectotypes and the Hog Bay specimens (AD 97016246 in part, and 07018154 in part) lectoparatypes.

P. halmaturina subsp. *halmaturina* and both subspecies of *P. paniculosa* occur on Kangaroo Island. A specimen from Kelly Hill Conservation Park, *E. N. S. Jackson 4493* (AD, MEL) appears intermediate between *P. halmaturina* subsp. *halmaturina* and *P. paniculosa* subsp. *paniculosa*, in having entire leaves which are rather densely simple-hispid on the upper surface as in the latter taxon, but larger (to 2.5 cm) and resembling the former in shape.

***Pomaderris halmaturina* subsp. *continentis* N. G. Walsh subsp. nov.**

P. halmaturina sensu Jessop in J. P. Jessop & H. R. Toelken (eds), Fl. S. Australia 2:812 (1986) *pro parte*.

P. oraria sensu J. H. Willis, Handb. Pl. Vic. 2:366 (1973) *pro parte, non* F. Muell. ex Reisseck (1858).

a subspecie typica floribus parvioribus (sepala c. 1.7 × 1 mm, thalamus 1–1.5 mm longus) et foliis margine sinuato non dentato differt.

HOLOTYPE: Victoria, Lower Glenelg River, far SW Victoria, on steep limestone banks between Eaglehawk Bend and Blackfish Ck, 29.x.1948, *J. H. Willis s.n.* (MEL 55384).

Differs from the typical subspecies in its leaves with sinuate, not dentate margins, and in its smaller flowers (thalamus tube 1–1.5 mm long, sepals c. 1.7 × 1 mm). Furthermore, in most specimens the leaves are relatively narrower, more acute at the base and apex, and have more deeply impressed lateral veins than the typical subspecies. Grows to at least 4 m high (*cf.* to 3 m recorded for *P. halmaturina* subsp. *halmaturina*). (Fig. 7)

REPRESENTATIVE SPECIMENS (Total examined 10):

Victoria—South-west, South Winnap, Lower Glenelg, 31.x.1948, *J. H. Willis s.n.* (MEL); South-west, Glenelg River at Keegans Bend, c. 4 miles (7.2 km) S of Drik Drik, 22.x.1960, *H. I. Aston 767* (MEL); South-west study area, 13 km E of Dergholm, 11.iii.1984, *A. C. Beaglehole 76428* (MEL); Lower Glenelg River, Jones Cliff, Keegans Bend, ii.1946, *A. C. Beaglehole 17192* (MEL).

South Australia—Hundred of Killanoola, NW corner, c. 30 km S of Narracoorte, 10.x.1965, *D. Hunt 2503* (AD); South-east, xi.1937, *Mr Machell* (AD).



Fig. 7. *Pomaderris halmaturina* subsp. *continentis*. a—flowering twig, $\times 1$. b—flower, $\times 8$. c—undersurface of leaf, $\times 4$, inset, $\times 10$. Drawn from the holotype.

DISTRIBUTION AND CONSERVATION STATUS (Fig. 9):

Apparently confined to the far south east of South Australia where known from only two collections (above), and adjacent areas of Victoria along the Glenelg River and its major tributaries south of Dergholm. *Pomaderris halmaturina* subsp. *continentis* is regarded as vulnerable. Its risk code is assessed at 3VCi (Briggs and Leigh, 1989). It occurs within the Lower Glenelg National Park, Victoria.

HABITAT:

In Victoria the subspecies is known from steep limestone-rich embankments near to and immediately adjacent to the Glenelg River where it occurs in *Eucalyptus pryoriana* open-forest, *E. ovata* riparian woodland and dense shrubland with *Pultenaea hispidula*, *Bursaria spinosa*, *Acacia myrtifolia* and *Correa reflexa*. On sandy soils developed on undulating country above the steep fall to the Glenelg River, plants occur in *E. baxteri* open forest. Associated species and habitat details are unknown for the taxon in South Australia, but the prevalence of old calcareous dunes in the region suggests that the subspecies may be confined to limestone country.

NOTES:

Jessop (1986), remarks on the resemblance of the specimen from near Narracoorte to *P. aspera*, the commonest member of the genus in Victoria. *P. aspera* differs from *P. halmaturina* in its larger leaves with rugose, prominently reticulate upper surfaces, in the larger, looser panicles and in the ovary which becomes semi-superior as it matures.

The subspecific epithet refers to the mainland occurrence of an otherwise mainly insular species.

5. *Pomaderris oblongifolia* N. G. Walsh *sp. nov.*

P. oraria sensu J. H. Willis, Handb. Pl. Vic. 2:366 (1973) *pro parte, non* F. Muell. *ex* Reisseck (1858).

ab aliis speciebus prope *P. orariam* F. Muell. *ex* Reisseck foliis oblongis vestitus indumento tenuissimo stellato distinguitur.

HOLOTYPE: Victoria, Gippsland, Tulach Ard Gorge, western bank of Snowy R., c. 28 km NE from Buchan; 37° 17'50"S, 148° 21'00"E, alt. c. 100 m, 15.xi.1988, N. G. Walsh 2191 and K. C. Norris (MEL 1564062). ISOTYPI AD, BRI, CANB, CHR, HO, K, NSW.

Slender shrub to c. 2 m high. *Stipules* narrow-subulate, to 5 mm long, densely stellate pubescent. *Leaves* alternate, oblong or narrow elliptic, mostly 2–6 × 0.6–1.5 cm, upper surface glabrous to densely and minutely stellate hispid, lower surface densely covered with fine pale, stellate tomentum, with scattered larger, rusty stellate hairs. *Inflorescence* of slender terminal and near-terminal axillary panicles to c. 5 cm long. *Flowers* densely covered with fine, rusty or pinkish, stellate hairs externally; thalamus tube conical, c. 1 mm long; sepals acute, 1.5–2 × c. 1 mm, the inner surface crimson; stamens subequal to sepals; anthers oblong, c. 1 mm long; style c. 0.7 mm long, trifid almost to base. Capsule c. 2.5 mm long; cocci c. 2 mm long, elliptic, dorsal surface almost flat, ventral surface keeled, operculum about 4/5 as long as coccus; seeds not seen.

Distinguished from other members of the *P. oraria* complex by the oblong leaves which are invested with an extremely fine, stellate indumentum. (Fig. 8)

REPRESENTATIVE SPECIMENS (Total examined 12):

Victoria—Snowy River Gorge, approx. 1.9 km NW of junction of Snowy R. & Mountain Ck, 37° 18'S, 148° 21'E, 18.i.1987, J. Eichler *s.n.* & J. Turner (MEL); Little R. Gorge, E of Wulgulmerang, 12.xi.1968, J. H. Willis *s.n.* (MEL); Snowy R. banks, east of Butchers Ridge, 31.viii.1952, N. A. Wakefield 4691 (MEL); Snowy R. gorge, E of Butchers Ridge, W Tree, 21.iv.1957, J. H. Willis *s.n.* (MEL). Snowy R. Gorge, E of Fork Track, 31.iii.1971, A. C. Beauglehole 37700 & K. C. Rogers (MEL, NSW).



Fig. 8. *Pomaderis oblongifolia*. a—flowering twig, $\times 1$. b—flower, $\times 10$. c—lower surface of leaf, $\times 4$. d—t.s. of leaf, $\times 20$. Drawn from the holotype.

DISTRIBUTION AND CONSERVATION STATUS (Fig. 9):

Known only from the gorge tract of the Snowy River, from its confluence with Little River downstream to New Guinea Bend, and from Little River at and below Little River Gorge. The species is regarded as rare, with risk code assessed at 2RCat (Briggs and Leigh, 1989). All known populations are reserved in the Snowy River National Park.

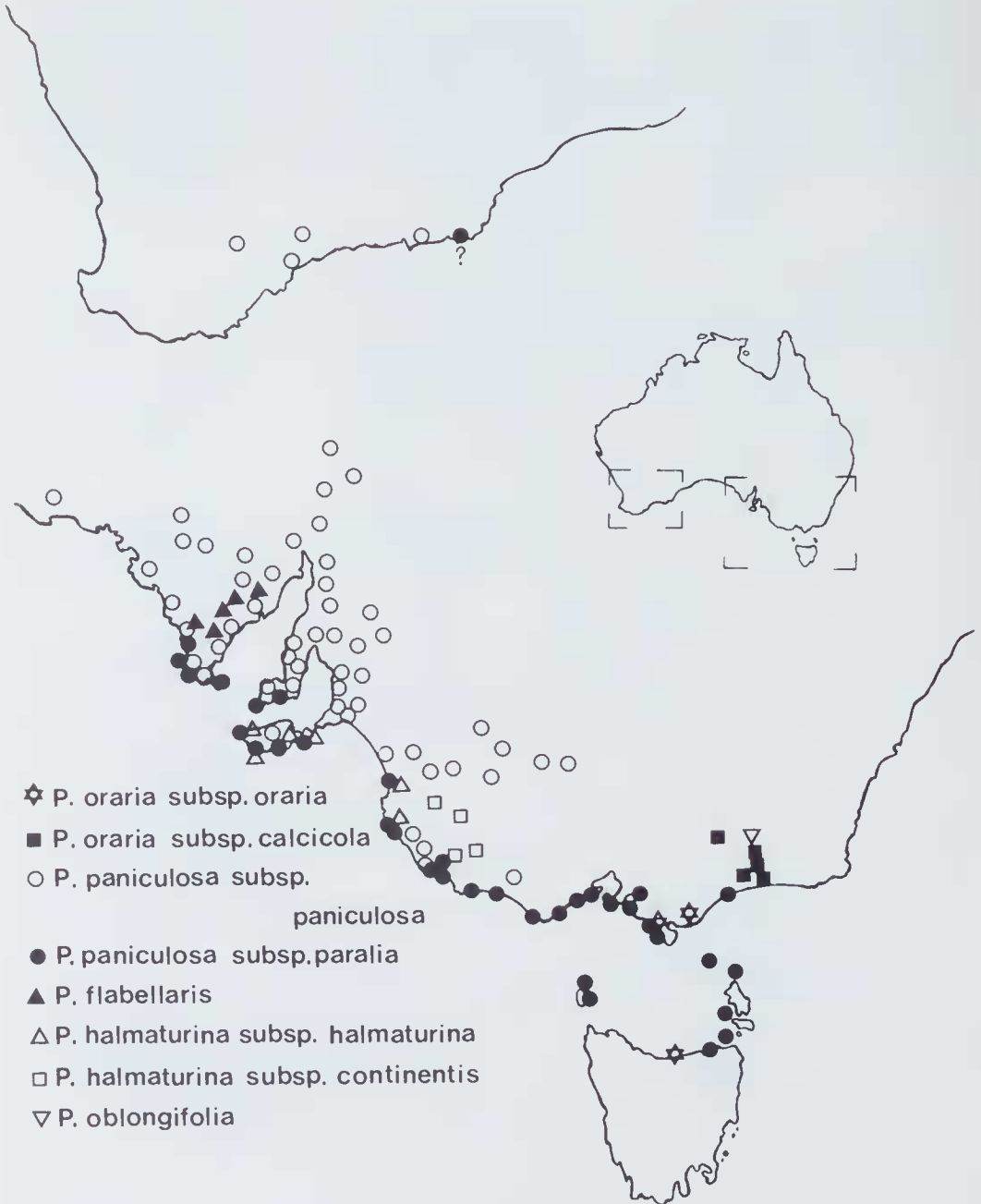


Fig. 9. Distribution of the *Pomaderris oraria* complex in Australia.

HABITAT:

The species occurs amongst rhyolitic boulders (Snowy River Volcanics) at about and slightly above the flood level of the rivers on broader, less steep banks between the contracted sections of the gorges. The community is a dense shrubland with dominant species including *Acacia boormanii*, *A. floribunda*, *Bursaria spinosa*, *Kunzea ericoides*, *Phebalium glandulosum* and *Calytrix tetragona*.

NOTES:

This is the entity referred to by Willis (1973) under *P. oraria* as a 'variant or perhaps related . . . species . . . of the Snowy R. gorge'. It bears a superficial resemblance to some larger-leaved specimens of *P. helianthemifolia* and *P. angustifolia* but both of those species have a glabrous ovary which becomes prominently raised toward maturity. In foliar characters *P. helianthemifolia* can be distinguished from *P. oblongifolia* in having simple hairs along the nerves on the lower (and often upper) surface. *P. angustifolia* typically has smaller (c. 1-2 cm long) leaves with strongly recurved margins and a sparser, coarser tomentum on the upper surface than does *P. oblongifolia*.

The gorge tract and lower reaches of the Snowy River are remarkable for the high number of species largely confined to it or which have major disjunctions in its vicinity (e.g. *Westringia cremnophila*, *Leucopogon riparius*, *Brachycome riparia*, *Acacia subtilinervis*, *Dodonaea rhombifolia*, *Phebalium glandulosum* etc).

The specific epithet refers to the characteristic leaf-shape of the species.

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Note added in press: *Pomaderris oraria* subsp. *oraria* was collected in January, 1990, from Flinders Island in Bass Strait [mid west coast near Reedy Lagoon, 39° 54'S, 147° 53'E: D. Albrecht 3923 (MEL)].

